Questions:

This new proposal is a departure from the low-tech approach because of the proposed use of excavators to re-shape the floodplain and topple vegetation. Please provide more specifics about the scope of disturbance and the topsoil management objectives.

Reply:

We understand that the proposed work can seem like a departure from the original low-tech process-based restoration (LTPBR) that we initiated in the Asotin IMW back in 2012. However, we feel it is completely consistent with the LTPBR adaptive management framework we used to implement restoration. We plan to preserve the intent of LTPBR - namely to restrain the use of heavy equipment to the minimal amount required to open up key sections of the floodplain as identified by the relative elevation model (see below). We visited a proof-of-concept site on the SRFB tour on May 2 where we had opened up a berm by hand. We are proposing the same process but with minimal intervention using a small excavator. The opening in the berms will be 10-30 feet wide and scaled based on the size of the stream (Table 1). The berms are generally made up of coarse gravels and cobbles with very little topsoil. If topsoil is present, we will remove the topsoil and use it to cover any trail disturbance caused by accessing the site. The remainder of the berm material (coarse gravels and cobbles) will be placed in the stream to fortify LWD structures that will be strategically installed around the berm opening to help force water onto the floodplain and into newly "daylighted" side-channels.

Table 1. Summary of the size of berm openings, estimated volume of excavated material, and management of material.

Stream	**Average Bankfull width (feet)**	**Estimated size of berm opening (feet)**	**Estimated fill from berm (cubic yards)**	**Management of topsoil and berm material**
Charley Creek	15	15-25	14-23	topsoil will be replaced along trail to access site; cobble and gravel berm material will be used to build instream structures
North Fork Asotin	32	30-40	27-37	topsoil will be replaced along trail to access site; cobble and gravel berm material will be used to build instream structures
South Fork Asotin	21	20-30	18-37	topsoil will be replaced along trail to access site; cobble and gravel berm material will be used to build instream structures

Some natural beaver dams appear to last decades. What is the long-term viability of this proposed low tech IMW project and how much annual maintenance might be warranted? Do you think a restoration team should refresh the IMW jams every year during the fish window for the foreseeable future? Will the site transition to passive restoration?

Reply:

This question is one of the more pressing questions that the IMW is trying to answer - "how much restoration and maintenance is required to achieve sustainable processes of LWD naturally entering the stream and accumulating as natural log jams". We do not know the exact answer to this question, but it appears that the answer is longer than 10 years (which is how long we have been adding LWD to the IMW streams). The riparian forests are recovering and the fire in 2021 has increased the availability of LWD to be recruited into the stream. We speculate that annual additions of LWD may not be necessary after the proposed additions of more restoration and maintenance, and LWD may only be necessary after large floods or other events (e.g., ice dams) that move large amounts LWD out of the system.

What is the plan for protection/utilization of the existing riparian forest that includes so many dead trees that were killed by fire? Is there a no-touch buffer width?

Reply:

The fire was very patchy along much of the riparian areas within the Asotin IMW study area. The vegetation is already recovering well, and trees and shrubs are resprouting in all riparian areas impacted by the fire. Fire is a natural part of the Blue Mountains forested ecosystems and the plants are well adapted to the fire regime. We will not be cutting any live trees unless they are in areas that are overstocked (i.e., dense stands that are still prone to fire) - in dense stands we will selectively remove sub-dominant trees for construction of LWD structures). Most of the trees we harvest will be dead as a result of the fire - we will still leave dead trees to provide for cavity nesting species. In areas where wood is limited at the site of construction, we will import LWD into the project area from nearby thinning operations on private or USFS land. We have been monitoring stream temperature for 15 years in Asotin Creek and stream temperature does not appear to be limiting fish production. We will use dead trees along the stream banks and do not anticipate these actions impacting stream temperature because the trees are already dead and will not provide any shade. We will not cut any live trees within the riparian area unless they are in overstocked stands where removal of the trees will not reduce the overall shade provided to the stream.

Improvements to Make Project Technically Sound:

More detail/prioritization of berm removal areas. A figure of all possible locations was provided, but the sponsor stated that they will be making a selection of 20-30? Information on how these will be selected and why needs to be provided. Metrics on the level of removal and at what flows these opening will be engaged needs to be provided.

Reply:

We provided prioritization of the berms to be opened up in Appendix H of the Basis of Design report (submitted to PRISM). To prioritize sites for opening up we scored each ***potential site*** by the ease of access to the site (i.e., is the site near a road, on the roadside of the stream, etc.), the length of potential side-channels to connect, and the area of potential floodplain to be reconnected. Each score was out of

3 (1 = low, 2 = moderate, 3 = high) and then the three scores were summed to get a total site rank. We ranked sites in each stream separately since the streams are different sizes. We will select the top 5-10 sites in each stream to open berms and reconnect side-channels and/or floodplains.

We have described the level of removal above in table 1. We will open the berm to approximately the width of the bankfull width of each stream (10-40 feet wide depending on the stream). We will open the berms up to engage summer low-flows. Therefore, we will open the berms so that the opening of the berm is at the elevation of the existing active channel. This generally means we need to remove 3-5 feet of berm height.

If there is a typical associated with this action or a description that provides details on the process, please include.

Reply:

A typical depiction of what we are proposing is best described by the proof-of-concept site we visited on May 2 and the Basis of Design Report we provided in PRISM (page 11). In 2021-2022, we identified one confining berm through field observations in North Fork Asotin Creek. The berm was cutting off almost 700 feet of side-channel and 1.5 acres of floodplain habitat (Figure 1). We opened the berm at the head of historic side-channels by digging by hand and installed structures in the mainstem to back water up to the openings in the berms (Figure 2). However, it took several days with a crew of 3-5 to open the berm by hand digging and we could not fully open the berm (i.e., dig down the elevation of the mouth of the side-channel to the same elevation of the main channel) due to tree roots and large substrate (Figure 2). We propose to replicate this activity but use a mini excavator to speed up the process and allow us to dig deeper to connect the side-channels and floodplain at the same elevation as the existing active channel to allow the connection to persist at summer low-flows.

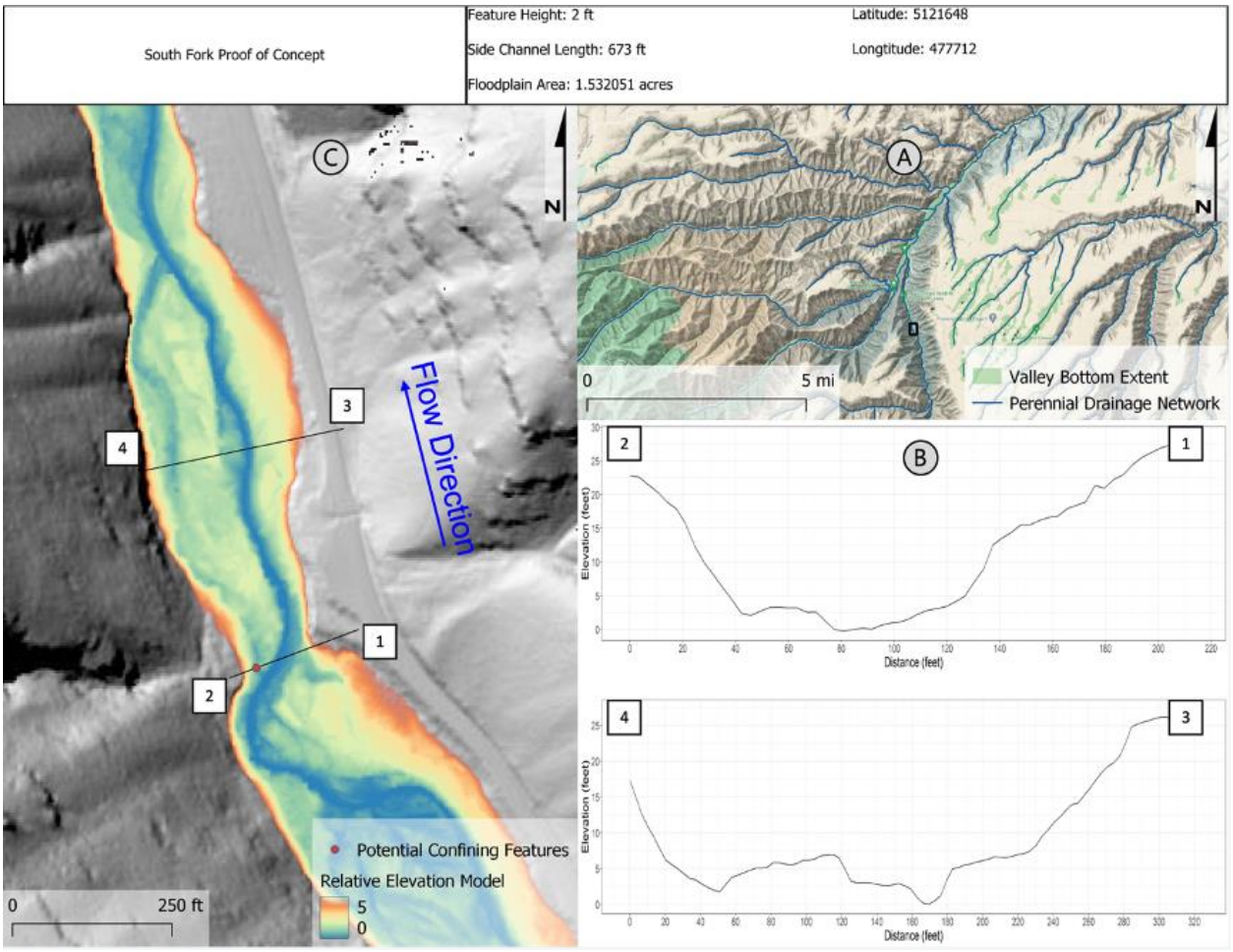

Figure 1. North Fork Asotin Creek proof of concept where we connected a historic side-channel by hand digging a berm down and installing a beaver dam analog to force water into the side-channel. Panels A identifies the location of site (black box), Panel B provides a cross-section at the confining feature (from points 1-2) and a cross-section across the recently connected side-channel and floodplain (from points 3-4).

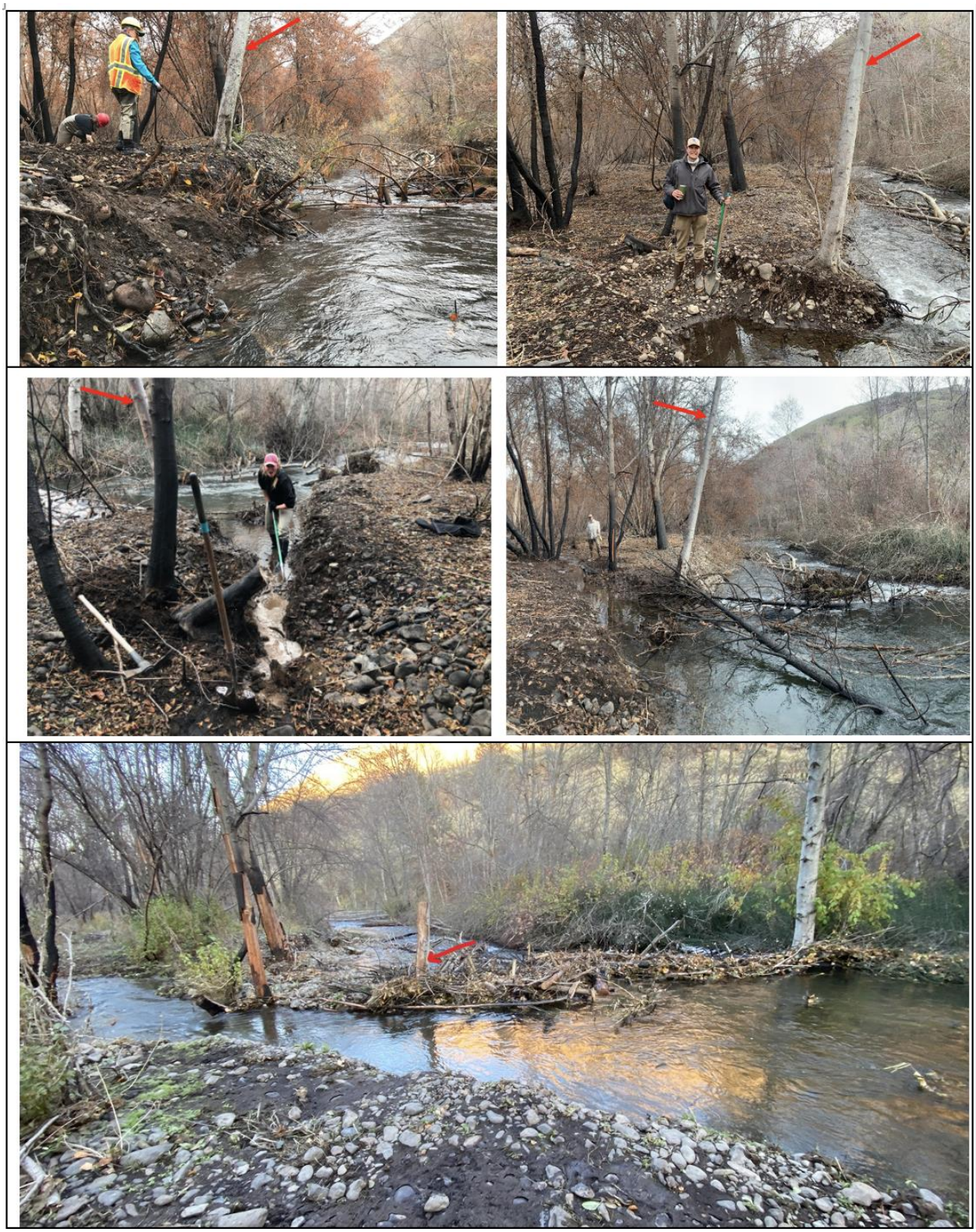

Figure 2. Digging open a berm at the head of a river left abandoned side-channel on North Fork Asotin Creek. Top left October 2021. Top Right and middle photos April 2022. Bottom photo September 2022. Red arrows reference the same alder tree. Post-assisted log-structure downstream of side-channel was built larger in September 2022 to backwater into side-channel.